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cannot be overestimated. With us the teacher does the asserting in his own, or other authority, the pupil simply accepts, and that ends it until examination day. But what critical scholarship, what mature judgment, has been, or can be formed by such a process?

No botanical laboratory is worth the name which does not include in its outfit a good working compound microscope, along with chemicals for each student, and type specimens, and a modern set of standard botanical works of reference which should be freely used. No botanical course, consisting of lectures exclusively can rise to the dignity of being contemptible, if its object is to make botanists or to even give a certificate of botanical proficiency. There is no biological laboratory of England where students investigate more critically the teachings of the chair than in that of Prof Huxley, nor, on the other hand is there any one which is producing now and promises in the future to produce a greater impression on the thought of the age. I conclude then that the time has fairly come for a change in our modes of teaching, and until we do adopt the methods of work which are now so universally followed abroad, we may expect to see an annual exodus of our most aspiring students to foreign seats of learning. Instead of concealing how much we lack of the true standard, the friends of liberal, practical, botanical education can do no more effective work than by agitating the subject until the remedy is furnished. There is yet one more aspect in which we may view this question. Popular ideas connect botany only with *flowers*. It is proper for us to insist that it produces *fruit* as well, that no science is more intimately associated with our food, drink, raiment and medicine than this. The public mind should be informed that it takes cognizance of practical forestry, of the diseases of our cereal grains, and indicates what we are to do in these directions.

That the impression should have prevailed so long that botanical study brings nothing of utility with it is largely our own fault. It is just what we have made it. When we work these needed reforms and show the public that we are in earnest, we may expect to see our science properly represented in every college of the land, but not before.—J. T. ROTHROCK.

Some Additions to the North American Flora, by Dr. G. Engelmann.—*ESCHSCHOLTZIA CALIFORNICA*.—The different forms of this common and extremely variable plant deserve to be studied more carefully at their homes, where they are found in such untold abundance. It is quite possible, as indicated in the Flora of California, that the several species into which it had been divided, may be sustained by reliable characters. All the forms, however, are said to be annuals with colorless juice. Now, on the sandhills of the ocean, quite close to the well-known Cliff-house near San Francisco, I found last October a form with long perennial roots, $\frac{1}{2}$ inch thick, abounding in orange-colored juice, and bearing several stems; leaves shorter than the internodes, often opposite, flowers 1 inch wide; torus broadly margined, capsule about 2 inches long, seeds reticulated. In most

respects it represents the typical form of *E. Californica*, but the perennial rootstock seems to distinguish it; annuals, to be sure, in mild climates not rarely last for several years, e. g. *Solanum nigrum* in southern California, but in these the stem becomes ligneous and no rootstock forms, the normal tap-root not losing its characters, even if it does become 3 or 4 years old. It is barely possible that *E. Californica* is one of those perennials which will flower as seedlings in the first years and that then the aridity of the climate in many instances kills it, root and all; but if so, why has this occasionally (?) perennial character not been observed before?

PORTULACA SUFFRUTESCENS, n. sp.—Erect, about a span high from a stout, branching and apparently perennial rootstock, ligneous at base; leaves terete, about 1 inch long, with sparingly hairy axils; flowers clustered at the end of the branches, large (7 to 10 lines wide), yellowish buff colored; petals obcordate or emarginate; stamens numerous; filaments, like the 5 or 6 stigmas, red; seeds dark, with metallic luster, tuberculate.

In western New Mexico, at the copper mines, *C. Wright*, 874, coll. 1851; *Coues* and *Palmer*, Fort Whipple, northern Arizona, 1865; found by myself 1880, on rocky banks in the Santa Rita Mountains, southern Arizona.

Very near *P. pilosa*, with which I had formerly united it; the seeds of both are similar, their tubercles, magnified 40–60 diameters, appear very prettily as overlapping excrescences with a toothed free edge; both have dark seeds, ours with a metallic luster, the others more dull. The number of stamens in different flowers was about 40; while in *P. pilosa* it is stated to be 15 to 25, but in cultivated specimens of the latter I have found as many as 50! The color and size of the flower, the larger leaves with sparing hair in the axils, and the stouter stems and perennial (?) rootstock distinguish it from its purple flowered annual relative.

ROSA SPITHAMEA, Watson, Fl. Cal., 2, 444.—In the deep shade of the Big Trees of Fresno county, Cal., where scarcely anything else grows, I found what I take to be a form of this pretty little species, blooming in September. I may designate it as

Var. SUBINERMIS: Stems a span high, glabrous or more or less glandular hispid, with a few scattered setaceous spines (none stipular) or spineless; stipules short and narrow with short narrow divaricate free points; leaflets mostly 5, thin, pale below, elliptical or nearly orbicular, obtuse, sharply serrate and glandular serrulate; rhachis glandular-pubescent and often spinulose, petiolule of terminal leaflet almost its own length; flowers single ($1\frac{1}{4}$ to $1\frac{1}{2}$ inches wide) rose colored; peduncle slightly glandular, calyx tube globose, naked, lobes entire.

The stems of the same season bear the flowers, as is the case in *R. foliolosa* of Texas; or is it in this instance an autumnal form? There may be characters enough, especially the absence of any stipular spines, to distinguish specifically this southern form from the northern type, but considering the great variability of roses it is thought best to keep them together for the present.

The western roses and, to some extent, all our roses are in some confusion and what my cursory visit to the Pacific coast may have done to clear them up is offered here.

ROSA NUTKANA, Presl, is common in Oregon and northward, but I have not met with it in California; it is characterized by very broad and stout stipular and cauline spines, which are particularly abundant on annual shoots, and by large single flowers and large globose or depressed fruit. *R. Durandii*, Crepin, from Oregon, appears to be a form of this species with glandular calyx tube, which in the species is glabrous.

ROSA PISIFORMIS, Gray, stands next to this and not to the following. Like it, it has well developed stipular spines, but they are slender and more terete; corymbs few-flowered, fruit smaller; young shoots mostly densely covered with dark red brown slender spines and spiny bristles, by which the plant can be distinguished any time, even without flower or fruit. I found it from British Columbia down to the neighborhood of San Francisco and Monterey.

ROSA CALIFORNICA, Cham. & Schl., a bush often 4-5 feet high, along streams, bears its flowers in large compound corymbs; its annual shoots are glaucous, covered with stout straight or often curved or even hooked glaucous spines; form of fruit variable, oblong or globose, with a more or less distinct contracted neck.—Common about San Francisco, thence northward to the Klamath River and southward to Los Angeles and San Bernardino.

ROSA GYMNOCARPA, Nutt., in the rich woods of the Oregon Coast Ranges with stems $1\frac{1}{2}$ -2 inches thick and 8 feet high. otherwise mostly a slender bush; annual shoots densely covered with glaucous or gray bristly spines; distinguished from all other roses, I believe, by its naked fruit (globose or elongated, sometimes pointed at both ends), from which after flowering the united calyx lobes separate, bearing at their base the stamens.

CAMPANULA SCABRELLA, n. sp.—Several leafy stems from a stout rootstock, a few inches high, 1 to several-flowered, the whole plant canescently-scabrous with very short rough pubescence; lower tufted leaves spatulate, obtuse, attenuated below, stem leaves sessile, lanceolate, acutish; flowers erect, lance-linear lobes of calyx as long as tube; ovate-lanceolate lobes of corolla as long as its tube, scabrous outside; style shorter than corolla; capsule erect, oblong, 10-angled, opening near the upper edge.

On bleak rocky ridges of Scott Mountain, west of Mount Shasta, under scattered trees of *Pinus albicaulis* and *P. Balfouriana* with *Anemone Drummondii*, Wats.,* *Veronica alpina*, *Polygonum Davisæ* and the charming *Epilobium obcordatum*, in August. The thick tap-root penetrates 3 to 5 inches between the fragments of rock; lower leaves 1

*Well distinguished from *A. multifida* not only by its larger fruit and long style, but also by the oval, not circular, outline of the more finely divided leaves, the terminal division of which is long stiped, not sessile.

inch long, the upper not much shorter; branches strictly erect, peduncles naked, flowers nearly $\frac{1}{2}$ inch long.

Distinguished from the closely allied *C. uniflora* by the habit, the canes and the form of the capsule. Careful study of abundant materials proves that *C. uniflora* will have to comprise all the forms from Colorado and Utah which have been named *C. Langsdorffiana* or *C. Scheuchzeri*, among them the specimens of Parry and of Hall with denticulate calyx lobes and similar ones gathered by myself; they have erect elongated capsules tapering below, opening near the top; corolla divided nearly to the middle, often 1 inch wide; stems 3 to 4 or 8 to 10 inches high, 1 to 4 flowered. True *C. Scheuchzeri* (or *linifolia*) comes from Alaska; its corolla lobes are short, $\frac{1}{3}$ or less of the tube, the short ovate capsule is nodding and opens at base. The confusion arose in great part from the carelessness of collectors, who are mostly satisfied with nice flowers and neglect the less conspicuous fruiting specimens. Among several dozen specimens from the Rocky Mountains and Alaska, gathered by different collectors, I find only few with the characteristic capsules, and these I collected myself. Fruit and seed are such important organs that they ought always to be hunted up, and of every plant; this necessity is well known in *Compositæ* and *Umbelliferae* but it is true of all plants and ought to be well borne in mind by collectors. Such neglect is one of the causes why the species of *Vitis* and especially the *Cactaceæ* were not better understood long ago.

A Double *Epigæa repens*.—A good many years ago, I think in 1867, my brother, Prof. L. W. Bailey, of Fredericton, N. B., sent me a note which I read before the Boston Society of Natural History, on a double *Epigæa repens*, found near his home. To-day Miss Sarah L. Mann, of Central Falls, R. I., communicates a specimen, found, she writes, among some flowers from Massachusetts. The precise locality is not given. The nearly sessile umbel presents seven blossoms all of which show increase of parts. The calyx exhibits no aberration, but is succeeded by three perfectly gamopetalous corollas, each within the other as in the familiar cases of doubling in *Datura* and like plants. In the changes the stamens have entirely disappeared, or are perhaps represented only by certain aborted, hood-like appendages to one or more of the lobes of the inner whorl. The pistil appears to be normal. In some of the flowers there are rudimentary filaments. The real, as well as the pseudo-corollas are provided with the usual pubescence, and are normal as to color and fragrance. It would be interesting to know whether this plant maintains itself as a perennial form, as in the case cited by my brother. I will add that the rosettes are extremely pretty, though to a botanist's eyes teratological developments are always a little obtrusive.—W. WHITMAN BAILEY, *Brown University*.

***Artemisia annua*, L.**—This thrifty weed which has for a number of years been cultivated for ornament under the name of